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Risk factors of parents abused as children: a mediational analysis of the intergenerational continuity of child maltreatment (Part I)

Louise Dixon, Kevin Browne, and Catherine Hamilton-Giachritsis

Centre for Forensic and Family Psychology, School of Psychology, University of Birmingham, UK

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Abbreviated Title: risk factors & mediational analysis of intergenerational child maltreatment

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Correspondence to

Louise Dixon, School of Psychology, University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK; Email: LXD036@bham.ac.uk

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Background: This study provides an exploration of factors implicated in the intergenerational cycle of child maltreatment. Families with newborns where at least one of the parents was physically and/or sexually abused as a child (AP families) were compared in terms of risk factors to families where the parents had no childhood history of victimisation (NAP families). The mediational properties of risk factors in the intergenerational cycle of maltreatment were then explored. **Methods:** Information was collected by community nurses as a part of the 'health visiting' service. Data was collated across 4351 families, of which 135 (3.1%) had a parent who self-reported a history of abuse in childhood. The health visitor visited each family at home when the child was 4 to 6 weeks of age to assess the presence of risk factors. **Results:** Within 13 months after birth, 9 (6.7%) AP families were referred for maltreating their own child in comparison to 18 (.4%) NAP families. Assessments found a significantly higher number of risk factors for AP families. Mediational analysis demonstrated that the presence of three significant risk factors (parenting under 21 years, history of mental illness or depression, residing with a violent adult) provided partial mediation of the intergenerational continuity of child maltreatment, explaining 53% of the total effect. **Conclusion:** Prevention may be possible, once a history of parental childhood abuse has been identified, by offering services in priority to those families where a parent is under 21 years, has a history of mental illness/depression and/or there is a violent adult residing in the household. However, it must also be acknowledged that these factors do not provide a full causal account of the intergenerational transmission and consideration should be given to additional factors, such as parenting styles (see Part II of this mediational model, Dixon, Hamilton-Giachritsis, and Browne, 2004).

Keywords: Intergenerational continuity, risk factors, child abuse and neglect.
Abbreviations: AP: abused parents; CCAN: current child abuse and neglect; CPR: Child Protection Register; NAP: non-abused parent; PChA: parental childhood abuse.

INTRODUCTION

Research has extensively assessed the impact of child abuse and neglect in terms of the intergenerational continuity of child maltreatment (Buchanan, 1996; Coohey & Braun, 1997; Egeland, 1988; Egeland, Bosquet & Chung, 2002; Friedrich & Wheeler, 1982; Hunter & Kilstrom, 1979; Kaufman & Zigler, 1987; McCloskey & Bailey, 2000; Spinetta & Rigler, 1972; Steele & Pollock, 1968). The general consensus from the literature is that individuals with a history of abuse in childhood are at increased risk of maltreating their own children. However, it is recognised that this pathway is the result of a complex interaction between risk, protective and mediating factors (Egeland, 1988).

Research indicates that parent and family risk factors occur at above average rates in individuals with a history of abuse (Egeland et al., 2002; Newcomb & Locke, 2001; Pears & Capaldi, 2001). Parent factors include anxiety, depression, poor self-esteem, emotional problems, substance abuse, mental illness (Briere, 1992) and poor interpersonal skills (Egeland et al., 2002). Family factors include poverty or low income (Brown, Cohen, Johnson, & Salzinger 1998; Straus & Smith, 1990), living with step-parents (Finkelhor, Hotaling, Lewis, & Smith, 1990), isolation or a perceived lack of social support (Crouch, Milner, & Thomsen, 2001; Egeland et al., 2002; Runtz & Shallow, 1997), early separation from the mother (Brown et al., 1998) and young parental age (Egeland et al., 2002; Straus, 1994). In addition, child characteristics associated with increased risk of maltreatment are particularly stressful for parents with a history of abuse, including the care of young children (Straus, 1994), physical disabilities (Goldson, 1998) and pregnancy or birth complications (Brown et al., 1998). Furthermore, individuals abused in childhood have a higher propensity

for involvement with violent partners (Fantuzzo, Boruch, Beriama, Atkins, & Marcus, 1997; Ross, 1996; Stark & Flitcraft, 1988; Tajima, 2000).

However, these symptoms are not present, or exclusive, to all adults with a history of childhood maltreatment. The majority of individuals who experienced maltreatment are not violent toward their own children (e.g., Kaufman & Ziegler, 1987; Widom, 1989). In an English prospective study, which followed up newborns for the first five years of life, 7.6% of parents with a history of abuse were found to have abused and/or neglected their child (Browne & Herbert, 1997). Retrospective studies in England give higher rates (e.g., 44%, Browne & Saqi, 1988), but are notorious for overestimating an association between two factors. In contrast, prospective studies such as this one where the health visitor does not know the outcome status of the family (i.e., AP vs. NAP families) tend to underestimate an association as some cases of abuse may be overlooked.

Research in the USA, utilising prospective approaches on high-risk samples, has estimated higher rates of transmission for young children between 18% (Hunter & Kilstrom, 1979; Straus, 1979) and 34% (Egeland & Jacobvitz, 1984). Overall, a review of three prospective studies by Kaufman and Zigler (1987) concluded that approximately one-third (30 ± 5%) of abused American children are likely to become abusing parents.

The wide variation in reported rates is due to methodological issues (Egeland et al., 2002; Pears & Capaldi, 2001), such as sample size of the study population, the length of follow-up, criteria for inclusion and whether the study took a retrospective or prospective approach. Therefore, it is very difficult to make any overarching estimates about the proportion of

parents with a history of child abuse that go onto maltreat their child, especially when cultural differences are taken into account.

However, methodological issues alone cannot account for the fact that only a minority of parents with a history of childhood abuse go on to abuse their own children. During their childhood and early adulthood, individuals can have experiences that act as protective factors, which can help break the intergenerational transmission of child maltreatment. For example, receiving emotional support, psychotherapy, stable relationships and home environments (Egeland, 1988, 1991). Therefore the adverse effects of childhood abuse are only one explanation for intergenerational transmission of parental violence. Farrington, Jolliffe, Loeber, Stouthamer-Loebe, and Kalb (2001) suggest several other mechanisms that account for intergenerational transmission of parental violence such as genetic influences on temperament and personality. Whilst examining current child abuse and neglect in terms of abusive experiences suffered by the parent in childhood will account for a proportion of the variance, models incorporating other theoretical factors may be needed to fully explain the intergenerational transmission of parental violence.

The recognition of variability in the behaviour of abused individuals has led to examinations of those factors that intervene in the intergenerational cycle of abuse and neglect. Just as multi-factor models have been proposed to account for the causes of maltreatment (Browne, 1989a; Cicchetti & Lynch, 1993; Putallaz, Costanzo, Grimes, & Sherman, 1998), there is a need to identify models that can explain the continuity of abuse and neglect. Appropriate interventions, designed to break the cycle of abuse and neglect, can then be developed (see Egeland et al., 2002).

This study aimed to explore risk factors, parental attitudes and behaviour implicated in the intergenerational cycle of maltreatment up to 13 months after the birth of a child in two family groups: those families in which parents were physically and/or sexually abused in childhood and those who were not. This first paper investigates the prevalence of risk factors between the two family groups and explores the mediating properties of risk factors for the intergenerational transmission of abuse. The second paper that follows considers the role of parental attitudes and behaviour as a protective factor, in order to further develop a model to explain the intergenerational continuity of child maltreatment (Dixon, Hamilton-Giachritsis, & Browne, 2004).

METHOD

Participants

Information was collected in the first 13 months of life on a population cohort of 4351 new-born children, born between 1 April 1995 and 30 June 1998, in Southend on Sea, Essex, England. Either the mother or her partner reported a history of physical and/or sexual maltreatment during their own childhood in 135 of these families (AP families); the remaining 4216 did not report such an abuse history (NAP families). With respect to ethnicity, the majority of both groups had a White UK child (96.3% AP families, 95.1% NAP families). Specifically, of the AP families, 26 (96.3%) had a White UK child and 1 a White UK/African child (3.7%). Of NAP families the ethnicity of 150 children was not classified, 3871 (95.1%) had a White UK child, 61 (1.5%) White European, 57 (1.4%) mixed ethnicity[1], 53 (1.3%) Asian, 23 (.6%) Afro-Caribbean and 1 (.02%) South American.

[1] Mixed ethnicity consisted of African/White UK, Chinese/White UK, Turkish/White UK, Indian/White UK, and Iranian/White UK

Likewise, there was no significant difference in gender between the groups. Within the AP families 67 (49.6%) of the index children were male and 68 (50.4%) female; similarly, 2181 (51.7%) of NAP families were male and 2035 (48.7%) female.

Procedures

Training

All the information for this research was collected by 103 community nurses during home visits to families with newborns. This was part of the Child Assessment Rating Evaluation (CARE) programme (Browne, Hamilton, Hegarty. & Blissett, 2000; Hamilton & Browne, 2002), used by the 'health visiting' service of the then Southend Community Care Services (National Health Service) Trust. The CARE programme has now become part of a SureStart initiative in South East Essex with at least four home visits to families with newborns in the first 13 months of the infant's life.

Each health visitor involved in the CARE programme received training (see Hegarty, 2000a) together with a CARE programme *Assessment Procedure Manual for Health Visitors* (Hegerty, 2000b) on the following topics:

- Partnership with parents (in-service training).
- Using the Index of Need[2] (one-day workshop led by Professor Kevin Browne, University of Birmingham, UK).
- Case load analysis and care plans (in-service training).
- Agreeing joint referral criteria with Social Services (joint training initiative).

[2] The weighted 'Index of Need' addresses 14 risk factors considered to be risk factors for child maltreatment (Browne, 1989; 1995a; Browne & Saqi, 1988) and is presented in appendix 1.

- Attachment behaviour and how to observe it (two day workshop led by Dr Pat Crittenden, Family Relations Institute, Miami, USA).

Therefore, expert psychologists provided 3 days of training on the use of risk factors and behavioural indicators to identify 'priority' families and children in need of referral to Social Services. This was a component of the full 10-day programme outlined above, which was organised for health visitors by Jean Hegarty, Designated Nurse for Child Protection, Southend Community Care Services (NHS) Trust. Additional inter-agency training was also organised to provide information on the CARE programme to social workers in child protection; general practitioners; paediatricians; and psychologists in the Children and Family Therapy Service.

Within the training, case studies for the identification of risk factors were presented together with video material demonstrating positive and negative parenting styles and patterns of attachment formation. In the *Assessment Procedure Manual for Health Visitors* (Hegarty, 2000b) details were given on agreed standards for interviewing the primary caregiver and responding to their comments in the context of the visit. These standardised procedures emphasised the role of the health visitor working in partnership with the mother to identify need and priority for services. To ensure these standardised procedures were used by the health visitors in a consistent and reliable way, statistical analysis was carried out on their work with families (see treatment of data).

Visits and data collection

Each family received a primary contact visit (new birth visit) from their health visitor. During this visit parents were introduced to the 'Index of Need'[2] (see Table 1) where they were asked to consider and identify which factors were relevant to their own family situation. Questions were phrased to access risk factors that may have been present *generally* within the family, allowing exploration of the family unit as a whole. Questions were not addressed specifically to each parent. Thus, it was not possible to separate out gender-specific responses.

The 'Index of Need' was left for both parents to discuss and complete. Preliminary feedback indicated that parents were generally responsive to this process, sometimes commenting that they had never disclosed difficulties previously because they had never been asked (Hegarty, pers .comm.). It also allowed both mothers and fathers to report a history of childhood abuse. This was based on the important issue of parental perceptions of having previously experienced physical and/or sexual abuse in their own childhood (<16years), therefore definitions were not provided to parents and details of the extent and frequency of their victimisation were not requested. In addition, with respect to the variable 'there is an adult in the house with violent tendencies', parents were not asked to provide details of the frequency and severity of any violence as the variable was intended to tap into perceptions of the *current* situation in a non-threatening way.

After the introductory visit, the same health visitor visited each family[3] when the child was 4-6 weeks of age and discussed the answers to 'Index of Need' with families. A total 'Index of

[3] Health Visitors completed an average of 42 forms each

Need' score was calculated for each family based on the number and combination of risk factors present[4].

Throughout the first 13 months after birth, information was collated as to whether the child was referred to Child Protection professionals for suspected or actual physical, sexual or emotional child abuse and neglect. This is referenced as 'Current Child Abuse and Neglect (CCAN)' for the purpose of this study.

Treatment of data

As the intergenerational transmission of abuse is a predominant factor in the maltreatment of children, those risk factors that mediate the cycle were explored, using the four-step mediational procedure advocated by Baron and Kenny (1986) and Kenny, Kashy, and Bolger (1998).

First, the dependent variable (DV) must be regressed onto the independent variable (IV) to demonstrate that there is an effect to be mediated. Secondly, the mediator must be regressed onto the IV and thirdly the DV onto the mediator whilst controlling for any effects of the IV (as a relationship may only exist because they are both caused by the IV). Fourthly, for full mediation the DV should no longer be significantly regressed onto the IV, whilst controlling for the effects of the mediator. However, partial mediation may be achieved when the pathway is reduced in absolute size but not reduced to non-significant levels. The statistical significance of partial mediators can be tested using the Baron and Kenny (1986) modification of the Sobel test. For the purpose of the present analysis, logistic regression was

[4] Maximum score is 25

used as an alternative to multiple regression to account for the categorical nature of the data.

Prior to mediational analysis, it was necessary to ensure that collinearity between risk factor variables did not affect the logistic regression statistic, so inter-correlations were computed. Phi correlation coefficients ranged from an acceptable -.05 to .36 and are therefore considered to be acting independently of one another.

To identify which risk factors mediate the intergenerational cycle of maltreatment, logistic regression analysis[6] examined which of the 13 risk factors were predicted by the IV (parental history of childhood abuse). In addition, risk factors predictive of the DV (current child abuse and neglect) were examined (controlling for any variance shared with the IV). Risk factors that were significantly regressed onto the IV and also regressed by the DV were utilised in the mediation analysis (see preliminary mediational analysis section in the results).

The logistic regressions are expressed in terms of the β coefficients[7], standard error[7] (SE) and their significance levels, the adjusted odds ratios (OR) and their 95% confidence intervals. The odds ratio is a statistic that demonstrates an increase (or decrease) in the odds of an outcome occurring with an increase (or decrease) in the predictor variable. For example, if a parent has been (or has not been) abused in their childhood, the odds ratio will demonstrate the degree to which they are more likely (or less likely) to continue the intergenerational cycle of maltreatment. The mediational property of a variable/s is described by identifying

[6]The risk factors were analysed collectively using direct logistic regression to increase the ecological validity of results, as risk factors would rarely occur in isolation in the family unit. Thus, any variance shared between variables was controlled for and significant predictors used in the mediational model are those that can account for the prediction alone.

[7]β values are the regression coefficients, and SE reflects the accuracy of the regression equation as a whole and of the coefficient (see Bryman & Cramer, 1999).

the percentage of the total effect that is explained by the presence of that variable/s. This effect is calculated by examining the reductions in β coefficients (see Kenny et al., 1998). In addition, for regressions, which explored the effects of variables in the intergenerational cycle of maltreatment, the Nagelkerke R^2 [8] is provided to report how much of the overall variance the model accounts for.

RESULTS

Of these 27 children, 7 (25.9%) were referred for physical abuse, 5 (18.5%) emotional abuse, 1 (3.7%) sexual abuse, 9 (33.3%) neglect and 5 (18.5%) multiple abuse and neglect. Numbers were too small to establish significant differences between AP and NAP families[8].

Characteristics of abused parent (AP) and non-abused parent (NAP) groups

Of the 4351 families, 135 (3%) contained a parent who reported suffering physical and/or sexual abuse as a child (abused parent families, AP). For the purpose of this study the total Index of Need Score (IoN) was derived after omitting the score gained by having a parental history of childhood maltreatment, as this was the discriminating group factor. The AP families had a mean IoN of 3.02 (SD = 2.87). In contrast, the 4216 (97%) families who did not have parents reporting abuse as a child (non-abused parent families, NAP) had a mean IoN of .86 (SD = 2.87). Hence, a significant difference was found ($t_{4349} = -15.443$, $p < .001$), with greater need among the AP families. The IoN for the AP families ranged between 2 to 14, with 86 (63.7%) families obtaining a score of 2 to 5 inclusive, 41 (30.4%) from 6 to10 inclusive and 8 (5.9%) from 10 to 14 inclusive. For NAP families IoN scores ranged between

[8] Nagelkerke R^2 has been proposed as an analogue to the R^2 in linear regression, it adjusts the Cox and Snell R^2 so that a maximum value of 1 can be achieved (see Tabachnick & Fidell, 2001).

0 and 13, with 3,313 (78.6%) scoring 0-1; 522 (19.5%) 2 to 5 inclusive; 74 (1.8%) 6 to 10 inclusive and 5 (.1%) 10 to 13 inclusive.

Preliminary analyses (Chi-Square and Fisher's Exact Probability Test) revealed significant differences between AP and NAP families on 10 of the 13 risk factors (see Table 1).

(Table 1 here)

Intergenerational continuity

Fisher's Exact Probability Test revealed that the AP families were significantly more likely to maltreat their infant within 13 months after birth (n = 9, 6.7%), in comparison to the NAP families (n = 18, .4%) (Fisher's Exact, $p < .001$).

Preliminary mediational analysis

Predicting the consequences of childhood abuse for parents

On examining the consequences of abuse in childhood for parents (see Table 2 for statistics), the 13 risk factors collectively explained 20% of the variance. This indicates that other important variables, resulting from abuse in childhood, were not included in this model. Three risk factors were significantly predicted by parental childhood abuse: 'both or one of the parents being under 21 years' (OR = 2.96), 'at least one of the caregivers had been treated for mental illness or depression' (OR = 8.66) and 'there is an adult in the house with violent tendencies' (OR = 5.03). Therefore, parental childhood abuse increases the chance of these three risk factors occurring by 196%, 766% and 403% respectively.

(Table 2 here)

Predicting current child abuse and neglect in the family

The 13 risk factors collectively accounted for 34.4% of the variance in the prediction of current child abuse and neglect, controlling for effects of the IV 'parental childhood abuse'. Again, this demonstrates that other factors, which predict 'current child abuse and neglect', are not included in this model (see Table 3 for statistics). Five risk factors were significantly predictive of current child abuse and neglect: 'both or one of the parents being under 21 years' (OR = 3.85), 'serious financial problems' (OR = 7.84), 'at least one of the caregivers had been treated for mental illness or depression' (OR = 3.29), 'single parenthood' (OR = 4.37), and 'there is an adult in the house with violent tendencies' (OR = 5.09). Therefore, the presence of these five risk factors occurring (when controlling for the effects of parental childhood abuse) increased the odds of current child abuse and neglect occurring by 285%, 684%, 229%, 337% and 409% respectively.

(Table 3 here)

Mediational analysis: the role of risk factors

In the mediational model, the IV is whether or not the parent had a history of physical and/or sexual abuse in childhood (parental childhood abuse, PChA) and the DV is whether a child was referred to or placed on the Child Protection Register (CPR) (current child abuse and neglect, CCAN). Mediator variables are 'both or one of the parents being under 21 years' (parent under 21), 'at least one of the caregivers had been treated for mental illness or depression' (MI/depression) and 'there is an adult in the house with violent tendencies' (violent adult). These were the only three risk factors included in the model because logistic regression demonstrated them to be the only variables to be significantly regressed onto

PChA. These factors have been demonstrated to be independent from one another as multicolinearity between all risk factors is minimal (see previous Phi correlation coefficients). In addition, the 3 risk factors are predictive even when controlling for any variance shared with other risk factors. Thus, firstly each factor's contribution to the model will be analysed independently.

(Table 4 here)

For each regression in the mediational model Table 4 displays the β coefficients, SE, significance levels, Nagelkerke R^2 values and adjusted odds ratios with their 95% confidence intervals. In addition, the percentage of the total effect that a mediator (and combinations of mediators) account for are detailed in the column titled '% of total effect explained'. The first equation found CCAN to be significantly regressed onto PChA (overall model significance test: -2 Log L, $\chi^2_1 = 29.8$, $p < .0001$). Thus step one of the mediational procedure is met, demonstrating that there is an effect to be mediated.

To comply with the second step of mediation it was demonstrated that all three mediator variables were significantly regressed onto the IV (PChA) independently; 'Parent Under 21' (overall model significance test: -2 Log L, $\chi^2_1 = 18.66$, $p < .0001$); 'MI/Depression' (overall model significance test: -2 Log L, $\chi^2_1 = 151.16$, $p < .0001$); 'Violent Adult' (overall model significance test: -2 Log L, $\chi^2_1 = 52.99$, $p < .0001$).

In accordance with the third mediational step, it was demonstrated that the mediators are related to the DV (CCAN) when controlling for the IV (PChA). Analysis found that all three

mediators significantly predicted CCAN, whilst controlling for the effects of PChA; Parent Under 21 (overall model significance test: -2 Log L, $\chi^2_2 = 38.91$, $p < .0001$); MI/Depression (overall model significance test: -2 Log L, $\chi^2_2 = 47.61$, $p < .0001$); Violent Adult (overall model significance test: -2 Log L, $\chi^2_2 = 48.20$, $p < .0001$).

For the fourth step of mediation, the effects of controlling for each mediator independently in the intergenerational pathway were calculated. Whilst all β coefficients and odds ratios where reduced in size, and Nagelkerke R^2 values increased, pathways were not reduced to non-significant levels; Parent Under 21 (overall model significance test: -2 Log L, $\chi^2_2 = 38.91$, $p < .0001$); MI/Depression (overall model significance test: -2 Log L, $\chi^2_2 = 47.61$, $p < .0001$); Violent Adult (overall model significance test: -2 Log L, $\chi^2_2 = 48.20$, $p < .0001$). Therefore, the Sobel test statistic was used to examine the effects of mediators independently in the intergenerational cycle of maltreatment. All three variables (Parent Under 21: $z = 2.76$, $p < .01$; Mental Illness/Depression: $z = 4.23$, $p < .0001$; Violent Adult: $z = 4.29$, $p < .0001$) were found to significantly partially mediate the effect of PChA and CCAN, thus demonstrating that each variable provides partial mediation of the intergenerational cycle of maltreatment in the present study.

In addition, PChA significantly predicted the outcome of CCAN whilst controlling for the presence of all 3 mediating variables together (overall model significance test: -2 Log L, $\chi^2_4 = 72.3$, $p < .0001$). Figure 1 demonstrates the *collective* mediational effects of risk factors in the intergenerational cycle of maltreatment. The percentage of the total effect that is accounted for by all mediating variables is 53.4% (see step 5 of Table 4). The contribution of each variable is not additive as they will share a small proportion of variance with each other and

other factors not accounted for in this model. It is of interest to note that the risk factors together provided 23% of the overall variance to be explained and 53.4% of the total effect. This is in comparison to using all 13 risk factors collectively (34.4%), which only increased the overall variance explained by a further 11.4%, whilst the total effect size explained remained unaltered.

Further effects of controlling for combinations of risk factors were also established (see steps 6-7 in Table 4).

(Figure 1 here)

DISCUSSION

In this study 13 risk factors were investigated as potential mediators of the intergenerational cycle of abuse. Findings demonstrated that AP families were significantly more likely to abuse their own child in the first 13 months of life (approximately 1 in 15), compared to approximately 1 in 234 of NAP families. The 6.7% intergenerational transmission rate of this 13-month prospective study in Essex is very similar to the 7.6% rate in a 5-year prospective study of newborns in Surrey (Browne & Herbert, 1997). AP families showed a higher prevalence for 10 of the 13 risk factors included in this study. This is in accordance with previous research (Briere, 1992; Brown et al., 1998; Crouch et al., 2001; Egeland et al., 2002; Ross, 1996; Runtz & Shallow 1997; Stark & Flitcraft, 1988; Straus, 1994; Straus & Smith, 1990; Tajima, 2000), which consistently demonstrates that being abused in childhood increases the likelihood of developing a 'high risk profile' in later parenthood.

Moving beyond the prevalence of risk factors to consider prediction and those factors that intervene in the risk of intergenerational transmission, mediational analysis demonstrated that only 3 factors significantly intercede in the pathway. Specifically, being a parent under 21 years, having a history of mental illness or depression and residing with a violent adult provided partial explanation of the intergenerational continuity of child maltreatment, explaining 53% of the total effect. A direct relationship does exist between a parental history of childhood abuse and current child abuse and neglect, as this study found AP families are 4 times more likely than NAP families to maltreat their children. However, the chances of intergenerational transmission increase in the presence of the three significant risk factors to make such AP families 17 times more likely than NAP families to maltreat their children.

When exploring the effects that single risk factors may have in the cycle, it is interesting to note that becoming a parent before the age of 21 accounts for the majority of the total effect explained. Thus, the odds of current child abuse and neglect occurring would be reduced from 17 to 5 times more likely to maltreat, if AP families planned later pregnancies. However, it is also important to highlight the combined effects that risk factors exert on intergenerational transmission. For example, whilst the absence of any two risk factors reduced the odds of intergenerational transmission greatly, the most effective combination was an absence of mental illness/depression and violent adults, followed closely by an absence of young parental age and mental illness/depression.

The finding that a parental history of childhood abuse increases the likelihood of a violent adult residing within the family home is also in accordance with previous literature. For example, Egeland et al. (2002) stated that an abusive childhood puts an individual at

increased risk of being drawn to violent partners or, alternatively, that an abusive childhood will predispose an individual to exhibit violence in later lafe (Egeland, 1988; Kaufman & Zigler, 1987). In turn, living with a violent adult increases the chance for current child maltreatment either by the mother and/or the violent adult. Again, this is consistent with previous research that has indicated a strong relationship between partner violence and child abuse (Browne & Hamilton, 1999; Browne, Falshaw, & Dixon, 2002; Dixon & Browne, 2003; McGuigan & Pratt, 2001; Moffitt & Caspi, 1998; Straus, Gelles, & Steinmetz, 1988; Tajima, 2000; Walker, 1984).

Parents who acknowledge their abuse as children may adjust their own risk of infant maltreatment by choosing not to live with violent partners, planning later pregnancies and by seeking help and support for mental illness/depression or family violence. As the analysis demonstrates, the risk increases or decreases depending upon the pattern of risk factors present within the AP family home. A practical application of this model is to provide the basis for a population screening tool for professionals to assess risk, using known risk factors, in order to predict child maltreatment occurring in the family. However, Browne and Herbert (1997) warn of the large number of false alarms ('false positives') in populations screened on the basis of risk factors alone. They assert that these factors are mediated through the parent-child relationship and that positive parenting styles would buffer any effects of adverse risk factors. Hence, there is a necessity to assess the quality of parenting in addition to risk factors to increase screening sensitivity and reduce the number of false positives. This will be explored in the second paper (Dixon, Hamilton-Giachritsis, & Browne, 2004).

Methodological considerations

Several limitations of this research need to be acknowledged. This study ethically utilised self-report. Previous research has demonstrated the lack of validity in self-report of risk factors compared to documented reports (Widom & Shepard, 1996) as the effects of social desirability bias may result in underreporting, especially when the self-report is not anonymous. Hence, in this study the 3% self-report prevalence of parental childhood abuse is approximately half of that found in an anonymous self-report study of young adults. The only anonymous self-report study in the UK (Cawson, Wattam, Brooker, & Kelly, 2000) was carried out on a nationally representative young adult community sample (n = 2689), which may not be an appropriate comparison to a sample of new parents. If critical information in this study was underreported, the predictions can still be conservatively estimated as the bias is in the opposite direction to the findings. Nevertheless, research asserts that the most successful method of identifying victims within health settings is to ask direct and specific questions (Feldhaus et al., 1997).

From the perspective of validity, it is also important to note that this study assessed the intergenerational cycle of maltreatment only within the first 13 months of an infant's life. A number of parents in both groups may also go on to abuse their child in later years. In fact, the incidence of child abuse and neglect cases on the Child Protection Register in the first year of life only accounts for 10% of all registrations and 30% from 1 to 4 years (40% registered under 5; Department of Health, 2003). Nevertheless, infants are an extremely high-risk group, particularly from physical abuse and neglect (see Browne, 2002).

At the time of the study, the highest rates of registration overall (64 per 10,000) and for physical abuse and neglect, on the English child protection register, are for children under one year (Department of Health, 1998). They account for 38% of all neglect cases and 33% of all physical abuse cases in England. By contrast, only 7% of sexual abuse cases involve infants. The national figures were similar to the relative percentages found for maltreatment in this study of Essex children less than 13 months (overall rate 62 in 10,000). Hence, it can be argued that this study is nationally representative of the incidence for child maltreatment and contributes to the understanding of at least one-third of all physical abuse and neglect cases.

This study examined the effects of risk factors on the family as a whole. It was not possible to separately investigate the effects of maternal and paternal childhood abuse. Future research could address this gender issue (see Newcomb & Locke, 2001). Finally, this research only addressed the intergenerational cycle of abuse with reference to a parent's childhood physical and/or sexual maltreatment; it did not measure the effects of neglect. Indeed, the work of Reiker and Carmen (1986) and Briere and Runtz (1988a, 1988b) points to the differential outcomes of the different types of maltreatment. Future research could address the differential consequences of various forms of childhood maltreatment.

CONCLUSION

The risk factor 'parent abused as a child' has been demonstrated to have a small but direct effect on the chances of an infant being maltreated. Therefore, it could be argued that community health professionals should sensitively determine whether a parent has been

abused in childhood. In many cases this may only be achieved by taking a family history. This study has shown that many parents are receptive to being asked about this issue by their community nurse.

Once AP families have been identified, health visitors making regular home visits can prioritise them for prevention. This may be achieved by referring AP families for specific services if other significant risk factors are present which further increase the likelihood of child maltreatment. Most importantly, parents under 21 years, parents with current or past mental illness/depression and parents who are violent or live in a violent household should be placed in priority for specialist services. These risk factors were shown to partially mediate the intergenerational transmission of child maltreatment. Indeed, evidence-based methods of decision making are advantageous in maximising the utilisation of limited resources in primary care. They can help target families in need for comprehensive assessments (e.g. Department of Health, Department of Education and Employment and the Home Office, 2000) on which intervention plans can be based.

Nevertheless, it has to be acknowledged that whilst the three risk factors accounted for 53% of the total effect, they only provide a partial explanation for intergenerational transmission. This may be a result of the presence of protective factors, such as positive parenting skills. Therefore, using risk factors alone for decision making is likely to generate a number of false alarms. The interplay between the identified mediating risk factors and parenting styles will be explored in Part II of this investigation (see Dixon, Hamilton-Giachritsis, & Browne, 2004).

REFERENCES

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology. 51,* 1173-1182.

Briere, J. (1992). *Child abuse trauma*. Beverly Hills, CA: Sage.

Briere, J., & Runtz, M. (1988a). Symptomatology associated with childhood sexual victimization in a non-clinical adult sample. *Child Abuse and Neglect*, *12*, 51-59.

Briere, J., & Runtz, M. (1988b). Multivariate correlates of childhood psychological and physical maltreatment among university women. *Child Abuse and Neglect*, *12*, 331-341.

Brown, J., Cohen, P., Johnson, J.G., & Salzinger, S. (1998). A longitudinal analysis of risk factors for child maltreatment: Findings of a 17-year prospective study of officially recorded and self-reported child abuse and neglect. *Child Abuse and Neglect, 22*, 1065-1078.

Browne, K.D. (1989a). The naturalistic context of family violence and child abuse. Chapter 8 in J. Archer and K. D. Browne (Eds.), *Human aggression: Naturalistic approaches*. London: Routledge.

Browne, K.D. (1989b). The health visitor's role in screening for child abuse. *Health Visitor*, *62*, 275-277.

Browne, K.D. (1995). Preventing child maltreatment through community nursing. *Journal of Advanced Nursing*, *21*, 57-63.

Browne, K.D. (2002). Child protection. In M. Rutter & E. Taylor (Eds.), *Child and adolescent psychiatry* (4th edn, ch. 70, pp. 1158-1174). Oxford: Blackwell Science.

Browne, K.D., Falshaw, L., & Dixon, L. (2002). Treating domestic violence offenders. In K. D. Browne, H. Hanks, P. Stratton, & C. E. Hamilton (Eds.), *Early prediction and prevention of child abuse: A handbook* (pp. 317-336). Chichester: Wiley.

Browne, K.D., & Hamilton, C.E. (1999). Police recognition of links between spouse abuse and child abuse. *Child Maltreatment*, *4*, 136-147.

Browne, K.D., Hamilton, C., Hegarty, J., & Blissett, J. (2000). Identifying need and protecting children through community nurse home visits. *Representing Children, 13,* 111-123.

Browne, K.D., & Herbert, M. (1997). *Preventing family violence.* Chichester: Wiley.

Browne, K.D., & Saqi, S. (1988). Approaches to screening for child abuse and neglect. In K. Browne, C. Davies, & P. Stratton (Eds.), *Early prediction and prevention of child abuse* (pp. 57-85). Chichester, UK: John Wiley & Sons.

Bryman, A., & Cramer, D. (1999). *Quantitative data analysis with SPSS release 8 for windows: A guide for social scientists* (pp. 252-256). London: Routledge.

Buchanan, A. (1996). *Cycles of child maltreatment*. Chichester, UK: John Wiley and Sons.

Cawson, P., Wattam, C., Brooker, S., & Kelly, G. (2000). *Child maltreatment in the United Kingdom. A study of the prevelance of child abuse and neglect.* London: NSPCC.

Cicchetti, D., & Lynch, M. (1993). Toward an ecological/transactional model of community violence and child maltreatment: Consequences for children's development. *Psychiatry, 56*, 96-118.

Coohey, C., & Braun, N. (1997). Toward an integrated framework for understanding child physical abuse. *Child Abuse and Neglect, 21,* 1081-1094.

Crouch, J.L., Milner, J.S., & Thomsen, C. (2001). Childhood physical abuse, early social support and risk for maltreatment: Current social support as a mediator of risk for child physical abuse. *Child Abuse and Neglect, 25*, 93-107.

Department of Health. (1998). Children and young people on child protection registers year ending 31 March 1998, England (Personal Social Services and Local Authority Statistics). London: Government Statistical Service.

Department of Health, Department of Education and Employment and the Home Office. (2000). *Framework for the assessment of children in need and their families*. London: HMSO.

Department of Health. (2003). Children and young people on child protection registers year ending 31 March 2002, England (Personal Social Services and Local Authority Statistics). London: Government Statistical Service.

Dixon, L., & Browne, K.D. (2003). Heterogeneity of spouse abuse: A review. *Aggression and Violent Behaviour*: *A Review Journal*, *8*, 107-130.

Dixon, L., Hamilton-Giachritsis, C., & Browne, K.D. (2004). Risk factors and behavioural measures of parents abused as children: A mediational analysis of the intergenerational continuity of child maltreatment. *Journal of Child Psychology and Psychiatry 2004.*

Egeland, B. (1988). Breaking the cycle of abuse: Implications for prediction and intervention. In K. Browne, C. Davies, & P. Stratton (Eds.), *Early prediction and prevention of child abuse* (pp. 87-99). Chichester: John Wiley & Sons.

Egeland, B. (1991). A longitudinal study of high risk families: Issues and findings. In R.H. Starr & D.A. Wolfe (Eds.), *The effects of child abuse and neglect: Issues and research*. London, UK: Guilford Press.

Egeland, B., Bosquet, M., & Chung, A.L (2002). Continuities and discontinuities in the intergenerational transmission of child maltreatment: Implications for breaking the cycle of abuse. In K.D. Browne, H. Hanks, P. Stratton, & C.E. Hamilton (Eds.), *Early prediction and prevention of child abuse: A handbook* (pp. 217-232). Chichester: Wiley.

Egeland, B., & Jacobvitz, D. (1984). *Intergenerational continuity of parental abuse; Causes and consequences:* Presented at Conference on Biosocial Perspectives in Abuse and Neglect, York, ME. Cited in Kaufman and Zigler (1987).

Fantuzzo, J., Boruch, R., Beriama, A., Atkins, M., & Marcus, S. (1997). Domestic violence and children: Prevalence and risk in five major US cities. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 116-122.

Farrington, D.P., Jolliffe, D., Loeber, R., Stouthamer-Loeber, M., & Kalb, L.M. (2001). The concentration of offenders in families, and family criminality in the prediction of boys' delinquency. *Journal of Adolescence, 24,* 579-596.

Feldhaus, K., Kozial-McLain, J., Amsbury, H., Norton, I., Lowenstein, S., & Abbot, J. (1997). Accuracy of three brief screening assessments for detecting partner violence in the emergency department. *Journal of the American Medical Association, 277,* 1357-1361.

Finkelhor, D., Hoteling, G., Lewis, I.A., & Smith, C. (1990). Sexual abuse in a national survey of adult men and women: Prevalence, characteristics and risk factors. *Child Abuse and Neglect, 14*, 19-28.

Friedrich, W., & Wheeler, K. (1982). Abusing parent revisited: A decade of psychological research. *Journal of Nervous and Mental Disease, 170*, 577-587.

Goldson, E. (1998). Children with disabilities and child maltreatment. *Child Abuse and Neglect, 22*, 663-667.

Hamilton, C., & Browne, K.D. (2002). Predicting physical maltreatment. In K.D. Browne, H. Hanks, P. Stratton, & C. Hamilton (Eds.), *Early prediction and prevention of child abuse: A handbook* (pp. 41-56). Chichester: Wiley.

Hegarty, J. (2000a). *The CARE Programme (Child Assessment Rating and Evaluation) Training Pack*. Southend on Sea, Essex: Southend Community Care Services (NHS) Trust.

Hegarty, J. (2000b). *The C.A.R.E Programme (Child Assessment Rating and Evaluation)*. *Assessment Procedures Manual for Health Visitors*. Southend on Sea, Essex: Southend Community Care Services (NHS) Trust.

Hunter, R., & Kilstrom, N. (1979). Breaking the cycle in abusive families. *American Journal of Orthopsychiatry*, *136*, 1320-1322.

Kaufman, J., & Zigler, E. (1987). Do abused children become abusive parents? *American Journal of Orthopsychiatry*, *57*, 186-192.

Kenny, D.A., Kashy, D.A., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert., S.T. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (4th edn, pp. 233-265). New York: McGraw-Hill.

McCloskey, L.A., & Bailey, J.N. (2000). The intergenerational transmission of risk for child sexual abuse. *Journal of Interpersonal Violence, 15*, 1019-1035.

McGuigan, W.M., & Pratt, C.C. (2001). The predictive impact of domestic violence on three types of child maltreatment. *Child Abuse and Neglect, 25*, 869-883.

Moffitt, T., & Caspi, A. (1998). Annotation: Implications of violence between intimate partners for child psychologists and psychiatrists. *Journal of Child Psychology and Psychiatry, 39,* 137-144.

Newcomb, M.D., & Locke, T.F. (2001). Intergenerational cycle of maltreatment: A popular concept obscured by methodological limitations. *Child Abuse and Neglect, 25*, 1219-1240.

Pears, K.C., & Capaldi, D.M. (2001). Intergenerational transmission of abuse: A two-generational prospective study of an at-risk sample. *Child Abuse and Neglect, 25,* 1439-1462.

Putallaz, M., Costanzo, P.R., Grimes, C.L., & Sherman, D.M. (1998). Intergenerational continuities and their influences on children's social development. *Social Development, 7,* 389-427.

Rieker, P.P., & Carmen, E. (1986). The victim-to-patient process: The disconfirmation and transformation of abuse. *American Journal of Orthopsychiatry*, *56*, 360-370.

Ross, S. (1996). Risk of physical abuse to children of spouse abusing parents. *Child Abuse and Neglect, 20,* 589-598.

Runtz, M.G., & Shallow, J.R. (1997). Social support and coping strategies as mediators of adult adjustment following childhood maltreatment. *Child Abuse and Neglect, 21*, 211-266.

Spinetta, J., & Rigler, D. (1972). The child abusing parent: A psychological review. *Psychological Bulletin*, *72*, 296-304.

Stark, E., & Flitcraft, A.H. (1988). Women and children at risk: A feminist perspective on child abuse. *Journal of Health Services, 10,* 97-117.

Steele, B., & Pollock, C. (1968). A psychiatric study of parents who abuse infants and small children. In R. Helfer & C.H. Kempe (Eds.), *The battered child syndrome* (pp. 103-148). Chicago, IL: University of Chicago Press.

Straus, M.A. (1979). Family patterns and child abuse in a nationally representative sample. *International Journal of Child Abuse and Neglect, 3,* 213-225.

Straus, M.A. (1994). *Beating the devil out of them: Corporal punishment by parents and its effects on children.* New York: Lexington Books.

Straus, M.A., Gelles, R.J., & Steinmetz, S.K. (1988). *Physical violence in the American family* (rev. edn). Newbury Park, CA: Sage.

Straus, M.A., & Smith, C. (1990). Family patterns and child abuse. In M.A. Straus & R.J. Gelles (Eds*.), Physical violence in American families: Risk factors and adaptations to violence in 8,145 families* (pp. 245-261). New Brunswick, NJ: Transaction Publishers.

Tabachnik, B.G., & Fidell, L. (2001). *Using multivariate statistics* (4th edn, pp. 517-581). Boston: Allyn & Bacon.

Tajima, E.A. (2000). The relative importance of wife abuse as a risk factor for violence against children. *Child Abuse and Neglect, 24,* 1383-1398.

Walker, L.E. (1984). *The battered woman syndrome*. New York: Springer.

Widom, C.S. (1989). Does violence beget violence: A critical examination of the literature. *Psychological Bulletin, 106,* 3-28.

Widom, C.S., & Shepard, R.L. (1996). Accuracy of adult recollections of childhood victimisations: Part I. Childhood physical abuse. *Psychological Assessment, 8,* 412-421.

Table 1: The prevalence of risk factors displayed by Abused Parent families (AP) and Non-abused Parent families (NAP) with a child 4 to 6 weeks of age (*N* = 4,351)

Risk factors[1]	AP (*n* = 135)	NAP (*n* = 4216)	Test Statistic[2] (df = 1)
Complications during birth/ separated from baby at birth (1)[+]	23 (17%)	462 (11%)	$\chi^2_{1 = 4.875,\ p} < .05$ *
Mother or partner under 21 years of age (1)[+]	23 (17%)	257 (6%)	$\chi^2_{1 = 25..995,\ p} < .0001$ **
Mother or partner not biologically related to the child (1)[+]	1 (0.7 %)	12 (.3%)	Fisher's Exact = > .05
Twins or less that 18 months between births (1)[+]	19 (14%)	299 (7%)	$\chi^2_{1 = 9.413,\ p} < .001$ **
Child with physical or mental Disabilities (1)[+]	4 (3%)	59 (1%)	Fisher's Exact >.05
Feelings of isolation (1)[+]	17 (13%)	105 (3%)	Fisher's Exact < .0001**
Serious financial problems (2)[+]	20 (15%)	143 (3%)	$\chi^2_{1 = 47.336,\ p} < .0001$**
Mother or partner treated for mental illness or depression (2)[+]	64 (47%)	303 (7%)	$\chi^2_{1 = 273.989,\ p} < .0001$ **
Dependency for drugs or alcohol (2)[+]	7 (5%)	18 (.4%)	Fisher's Exact < .0001**
Infant seriously ill, premature or weighed under 2.5kg at birth (2)[+]	17 (13%)	226 (5%)	$\chi^2_{1 = 12.975,\ p} < .0001$**
Single parent (3)[+]	13 (10%)	268 (6%)	$\chi^2_{1 = 2.319,\ p} = .128$
Adult in the household with violent tendencies (3)[+]	16 (12%)	33 (.8%)	Fisher's Exact < .0001**
Mother or partner feeling indifferent about their baby (3)[+]	6 (4%)	44 (1%)	Fisher's Exact < .01**

[1]For an explanation of the risk factors see 'visits and data collection' section
[2]* $p < .05$;
[2]** $p < .01$
[+]Weighted Score summed to produce an Index of Need score for each family.

Table 2: Risk factors predicted by parental childhood abuse (PChA), as determined by logistic regression analysis

Risk factors[1]	Nagelkerke R Square [2]	B [2 3]	SE[2]	Adjusted[2] odds Ratio (EXP(B))	95% Confidence Intervals for EXP (B)[3]	
					Lower	Upper
PChA → all 13 risk factors	.195					
Complications during birth/separated from baby at birth		.06	.28	1.06	.61	1.84
Mother or partner under 21 years of age[3]		**1.09****	**.27**	**2.96**	**1.74**	**5.05**
Mother or partner not biologically related to the child		.94	1.10	2.57	.30	22.04
Twins or less that 18 months between births		.52	.28	1.69	.97	2.93
Child with physical or mental disabilities		.09	.61	1.09	.33	3.57
Feelings of isolation		.45	.34	1.56	.80	3.10
Serious Financial problems		.47	.32	1.6	.85	3.00
Mother or partner treated for mental illness or depression[3]		**2.16****	**.20**	**8.66**	**5.87**	**12.79**
Dependency for drugs or alcohol		.19	.62	1.21	.36	4.08
Infant seriously ill, premature or weighed under 2.5kg at birth		.45	.34	1.57	.81	3.10
Single parent		.22	.34	.80	.41	1.56
Adult in the household with violent tendencies[3]		**1.16****	**.4**	**5.03**	**2.30**	**11.10**
Mother or partner feeling indifferent about their baby		.43	.52	1.54	.57	4.20

[1]For an explanation of the risk factors see method & Table 1
[2]For explanation of statistical terms see treatment of data section.
[3]$^{**}p < .01$.

Table 3: Risk factors predictive of current child abuse and neglect (CCAN), as determined by logistic regression analysis

Risk factors[1]	Nagelkerke R2[2]	β[2,3]	SE[2]	Odds[2] ratio (EXP(B))	95% Confidence Intervals for EXP (B)[2]	
					Lower	Upper
PchA[4] → CCAN[4] (controlling for all 13 risk factors)	**.344**	**1.31***	**.52**	**3.70**	**1.34**	**10.25**
Complications during birth/separated from baby at birth		-.93	.80	.4	.08	1.88
Mother or partner under 21 years of age[3]		**1.35***	**.50**	**3.85**	**1.44**	**10.266**
Mother or partner not biologically related to the child		-4.64	24.6	.01	.00	8.2E + 18
Twins or less that 18 months between births		.95	.57	2.59	.85	7.89
Child with physical or mental disabilities		.68	.92	1.98	.33	11.86
Feelings of isolation		.68	.57	1.98	.65	6.07
Serious financial problems[3]		**2.06***	**.49**	**7.84**	**3.07**	**20.00**
Mother or partner treated for mental illness or depression[3]		**1.19***	**.49**	**3.29**	**1.25**	**8.65**
Dependency for drugs or alcohol		.45	.81	1.57	.32	7.72
Infant seriously ill, premature or weighed under 2.5kg at birth		.39	.87	1.47	.27	8.1
Single parent[3]		**1.47****	**.48**	**4.37**	**11.26**	**1.71**
Adult in the household with violent tendencies[3]		**1.63****	**.61**	**5.09**	**1.55**	**16.68**
Mother or partner feeling indifferent about their baby		.54	.87	1.71	.31	9.38

[1]For an explanation of the risk factors see method section and Table 1.
[2]For explanation of statistical terms see treatment of data section.
[3] $^{**}p < .01$; $^{*}p < .05$
[4]PChA = Parental childhood abuse; CCAN = Current child abuse and neglect.

Table 4: Logistic regression analysis examining the mediating effects of 3 risk factors on parental childhood abuse (PChA) predicting current child abuse and neglect (CCAN)

Equation variables[1]	Nagelkerke R^{2}[2,2]	β[2,3]	SE[2]	% of total effect explained[3]	Odds[2] ratio (EXP(B))	95% Confidence Intervals for EXP (B)[2]	
Step:						Lower	Upper
1. PChA predicting CCAN (direct pathway)	0.094	2.81**	0.42		16.7	7.34	37.80
2. PChA predicting Parent Under 21		1.51**	0.24		3.16	1.98	5.04
PchA predicting MI/Depression		2.45**	0.18		11.64	8.14	16.64
PchA predicting Violent Adult		2.84**	0.32		17.04	9.13	31.82
3. Parent Under 21 predicting CCAN (controlling for PChA)		1.50**	0.45		4.47	1.87	10.72
MI/Depression predicting CCAN (controlling for PChA)		1.96**	0.44		7.13	3.00	16.92
Violent Adult predicting CCAN (controlling for PChA)		2.69**	0.55		14.71	5.02	43.10
4. PChA predicting CCAN (controlling for Parent Under 21)	0.12	1.50**	0.45	46.62 %	4.47	1.87	10.72
PchA predicting CCAN (controlling for MI/Depression)	0.15	1.96**	0.44	30.25 %	7.13	3.00	16.92
PchA predicting CCAN (controlling for Violent Adult)	0.15	2.69**	0.55	4.3 %	14.71	5.02	43.10
5. PChA predicting CCAN (controlling for all three mediating risk factors)	0.23	1.31**	0.50	53.4 %	3.71	1.39	9.86
6. PChA predicting CCAN (controlling for Parent Under 21* MI/Depression)	0.18	1.65**	0.48	41.28 %	5.18	2.01	13.36
7. PChA predicting CCAN (controlling for Parent Under 21*Violent Adult)	0.18	2.04**	0.47	27.40 %	7.67	3.03	19.4
8. PChA predicting CCAN (controlling for MI/Depression*Violent Adult)	0.20	1.47**	0.50	47.69 %	4.34	1.63	11.58

[1]PChA = Parental childhood abuse; CCAN = Current child abuse and neglect.
[2]For explanation of statistical terms see treatment of data section.
[3]*$p < .05$; ** $p < .01$

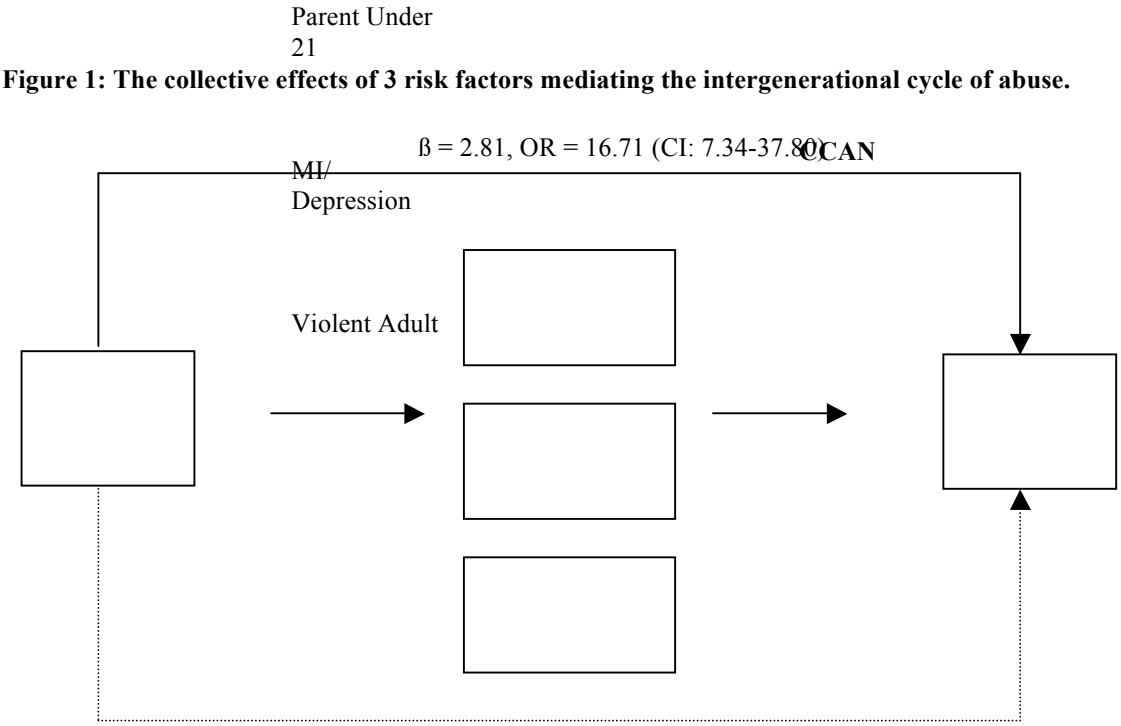

Figure 1: The collective effects of 3 risk factors mediating the intergenerational cycle of abuse.

[1]See Table 4 for the Nagelkerke R^2, SE, and % of total effect explained and individual effects of each risk factor

[2]Collectively the 3 risk factors significantly partially mediate the direct pathway